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ABSTRACT

The educational applications of technology are many and varied, including use as an educational delivery method and an instructional tool. However, technology is often introduced without much thought, and it changes rapidly. Technology can have the following effects: improve educational attainment and skill development; reduce educational inequities; improve the relationship between learning, assessment, and effectiveness; provide a relevant context for learning; and empower learners. When educational technologies are used appropriately, their advantages far outweigh their disadvantages. Some guidelines for using technology in adult and vocational education include the following: (1) let learning outcomes drive the process of technology choice; (2) strive to infuse or integrate technology into the instruction; (3) use technology to shift the emphasis in teaching and learning; (4) be prepared to modify the role of the instructor; and (5) use technology to move the focus away from low-level cognitive tasks to higher-order thinking skills. Used appropriately, technology can support many of the goals of adult and vocational education. (Contains 15 references.) (KC)

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ERIC Clearinghouse on Adult, Career and Vocational Education

by Susan Imel

PRACTICE APPLICATION 1999
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Using Technologies Effectively in Adult and Vocational Education

Technology is not a means to an end. We must know how to use this technology and use it to better meet the needs of our learners. Noreen Lopez, PBS LiteracyLink (Rosen 1999)

The current emphasis on the educational applications of technology differentiates this wave of technological innovation from those of the past (Merriam and Brockett 1997). Technology as both an educational delivery method and instructional tool is being discussed widely in adult and vocational education. However, it is often introduced without much thought, and it changes rapidly. This *Brief* presents information about educational applications of technology and provides some guidelines for its use in adult and vocational education.

The Case for Technology

Technology permeates our society. Recent news stories about the Y2K problem, for example, provide evidence of the dependency of modern life on computer technology. Website addresses now appear regularly in the media with the assumption that they will be consulted for further information. In work settings, employees are expected to use computers for such tasks as communication, information management, problem-solving, and information seeking. Because technology is such an integral part of modern life, it behooves educators to prepare learners to use it effectively.

However, technology also has a role in the instructional process for it can serve as a means of supporting and enhancing instruction. Based on an analysis of the literature, Hopey (1998) noted that educational technology can—

- Improve educational attainment and skill acquisition
- Reduce the educational disparities created by race, income, and region
- Improve the relationship between learning, assessment, and effectiveness
- Provide a relevant context for learning
- Accommodate differences in learning
- Motivate and sustain learning
- Provide greater access to learning opportunities
- Empower learners

The positive effects attributed to technology will occur only if it is used appropriately. Like any other instructional tool, technology can serve to perpetuate poor educational practice or it can become a means for transforming learning. How technology can enhance and support learning is discussed in the next section.

Considerations for Using Technology

Technology does not determine learning outcomes, and it does not teach students; teachers, frequently in collaboration with learners, make the choices that determine learning outcomes and manage the teaching and learning process (Burge and Roberts 1993; Ehrmann 1997; Whitesel 1998). The role of technology is to expand these choices (Ehrmann 1998). Technologies are not neutral tools, however. The choices made about which technologies to use as well as how to use them will "reflect whatever values the educator holds—consciously or subconsciously—about her/his relationships with learners, and their use will invariably bring advantages and disadvantages" (Burge and Roberts 1993, p. 35).

When educational technologies are used appropriately, their advantages far outweigh their disadvantages. The ability to support new ways of teaching and learning is one of the most frequently cited reasons for using technology in education. For example, it provides opportunities for more learner-centered instruction; it permits instruction to be contextualized; it allows students to explore, make mistakes, and learn from their errors; it leads to more active and interactive modes of instruction; and it results naturally in greater collaboration, cooperation, and small group work (Gillespie 1998; Kearsley and Shneiderman 1998; Petraglia 1998).

These characteristics of teaching and learning should be particularly attractive to adult and vocational educators for they are frequently associated with good educational practice in those fields. The key is using the technologies in ways that will enhance learning. Technology cannot simply be an add-on but "must be matched by new imagination" (Koehler 1998, p. 36), new mental models (Dickson and Segars 1999), and infusion into the instructional process (Sulla 1999). It must be accorded a presence in the classroom in its own right and used in ways that maximize the different strengths that is has to offer (Koehler 1998).

Guidelines for Using Technology In Adult and Vocational Education

Some guidelines for using technology in adult and vocational education to achieve the outcomes described in the previous section follow:

- Let learning outcomes drive the process of technology choice. It is easy to get caught up in all the hype associated with technology and to want to be part of the group that is using the latest technological innovation. "Technology should not 'wag the dog,'" however (Gandalfo 1998, p. 36). Technology is only a tool and decisions to use any technology must be made as a part of an overall instructional plan. Questions to consider include What am I trying to accomplish? and Will technology help me achieve that goal?

- Strive to infuse and/or integrate technology into the instruction. Technology should be integral to the teaching and learning process. In most settings, it should be invisible and transparent. Ginsburg (1998) presents a helpful way to think about integrating technology into adult learning that is also applicable to vocational education by proposing four basic approaches: technology as curriculum, delivery mechanism, compliment to instruction, and instructional tool. Each approach has its benefits and limitations but the latter—technology as instructional tool—is superior to the other approaches. In this approach, the primary instructional goals remain the same with technology being used to enrich and extend them. The approach moves technology beyond being seen as an end in itself to being a tool that is integral to learning (Sulla 1999). Because some adult and vocational education programs provide instruction about the technology itself and the skills to use it, however, technology as curriculum may be the most appropriate approach in some settings.

- Use technology to shift the emphasis in teaching and learning. Traditionally, the emphasis in teaching and learning has been on the instructor as both the subject-matter expert and as the primary deliver of instruction. Theories of learning that undergird much of adult and vocational education call for a different emphasis, one

that is more learner centered and that depends on contextualized learning opportunities. Under the more traditional teaching-learning paradigm, such goals have not always been easily achieved. The emergence of some of the new technologies, particularly the Internet and the World Wide Web, supports the use of these more collaborative, contextualized approaches. Technology can enable learners to take a more active role in the learning process, to use a greater variety of learning styles, to have access to a wider range of resources, and to engage in collaborative learning through increased interaction with other students (Gillespie 1998).

- **Be prepared to modify the role of the instructor.** When the emphasis in teaching and learning shifts to be more learner centered, the role of the instructor changes. Technology can assume some of the tasks formerly performed by the teacher, freeing the teacher to facilitate the process of discovery for the students. Technology enables the instructor to becomes a facilitator of learning as well as a planner, guide, and mentor. Also, when technology is used to provide access to information and knowledge outside the classroom, the teacher no longer has the primary role of subject matter expert (Gillespie 1998; Koehler 1998; Whitesel 1998). For those adult learners who prefer a less directive style of instruction and a less hierarchical relationship, this change is particularly welcome (Whitesel 1998).

- **Use technology to move the focus away from low-level cognitive tasks to higher-order thinking skills.** The traditional model of systematic instructional design "requires the specification of precise levels of content and learning objectives and is based on the teacher as content expert and controller of student learning" (Gillespie 1998, p. 47). New technologies, however, can be used to move away from a focus of these low-level cognitive tasks to the development of higher-order thinking skills. To develop synthesis and integration skills, for example, students can be given the assignment of using the Internet to find material that represents a variety of perspectives and then asked to develop an interpretation of it (ibid.). To move to this level, instructors need to ask several questions including 'What skills do I want the learner to address?' and 'How can technology be used to support the development of these skills (ibid.)?'

Conclusion

Used appropriately, technology can support many of the goals of adult and vocational education. The path to wise use begins by asking 'What do I want to accomplish?' and then considering how technology can play a role in achieving those goals.

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